Collective action to address GHG emissions in seafood

An outline proposal

Contents

Collective action to address GHG emissions in seafood

1. Introduction

This paper is an outline proposal for collective action to address GHG emissions in seafood. The proposed programme is for collective action to reduce GHG emissions in the fisheries and aquaculture sectors and their related supply chains through international collaboration, data sharing, and shared understanding in seafood GHG emissions.

2. Background

Over the last few years, the widely held belief by the scientific community and governments that GHG emissions are contributing to global warming and ocean acidification has raised opportunities and risk areas for the seafood industry. These include, for example, the potential for new regulations and greater awareness amongst consumers. There is also the opportunity for stakeholders to develop a greater understanding of industry systems, appreciate the comparative GHG emission advantages that much seafood enjoys relative to beef and pork, challenge myths and make improvements for the longer term good.

The nature of fisheries, aquaculture and seafood supply chains presents a number of challenges when trying to understand industry systems. The seafood industry is highly heterogeneous, complex-dynamic, and characterized by a diverse range of local and international trading and production systems. There is general acknowledgement amongst many in the UK and other country's seafood sectors that greater collaborative action, and maintaining diversity, is important within the seafood industry if it is to develop resilience and rise to the challenge of sustainable consumption and production, and food security.

Life-cycle assessment (LCA) offers an important methodology for understanding industrial systems from an environmental perspective. LCA is a framework for quantifying material and energy resource inputs and resulting environmental impacts associated with the life-cycle of a given product and service. Though its application to food systems is a relatively new research field and particularly so with respect to seafood systems, the number of published seafood LCAs is rapidly growing. In this regard, the FAO has started to utilize LCA as a tool to better understand the magnitude and overall contribution of GHG emissions in food production sectors and to also identify effective approaches to reduce emissions, and to identify where in the food chain to target these efforts.

Seafish, UK seafood processors, Dalhousie University and others have collaborated on the quantification of GHG emissions ("carbon footprint") and more general life cycle assessment of seafood systems, both formally and informally, collectively and independently, since 2006. Given the recent development of the emissions agenda, it is not surprising that efforts to date to characterize supply chain GHG emissions can be considered iterative and fragmented, leading to profiles of several seafood systems at various levels of detail and rigour through the application of a range of emissions profiling tools or approaches. This experience has afforded particular insights into the practicalities of understanding GHG emissions in seafood at the national level as well as creating an opportunity for broader discussion on GHG emissions and standards at the international level.

3. The challenges to be addressed

A number of challenges face the seafood industry in more rigorously and systematically understanding GHG emissions of their supply chains whether the purpose is to effect improvements, make product declarations or simply to address misperceptions regarding the industry. These challenges include: complexity and variability of some critical supply chain inputs (e.g. feed inputs to aquaculture systems); a general paucity of representative data regarding key supply chain inputs (e.g. fuel inputs to fishing vessels) or activities (e.g. rates of waste/shrinkage across supply chains); ongoing methodological issues related to boundary setting and accounting for co-products; and a general lack of required resource and expertise. Moreover, whilst an understanding of risks, trade-offs and mitigating action can be taken 'locally' within the control of individual organisations, attempting this beyond the organisational boundary, i.e. at a system level, often serves to amplify the above challenges.

Methodologies

Despite growing interest, the number of published LCA and more narrowly focussed carbon footprint analyses of seafood systems, remains limited, particularly given the diversity of seafood systems.

Although the number of LCA analyses has grown, and most of those that have been published have followed the internationally established LCA methodological standard there are differences in approach regarding some key methodological issues that can, in some instances, affect analytical outcomes. This can make it difficult to compare findings across studies and prohibits the sharing of useful data (that could unlock efficiencies in accounting for GHG emissions). While it is beyond the scope of this proposal to describe these methodological issues in detail, they include decision making on the boundary setting problem and allocation of GHGs.

There is a lack of clarity on GHG emissions methodologies in seafood and as such there is an 'industry conversation' to be had concerning a common method or approach for seafood. Achieving broad agreement within the fisheries and aquaculture sector on this issue would increase opportunities to share data within industry, reduce potential confusion and ambiguity when data are reported to customers, the public and other stakeholders. It would also provide a basis upon which to seek an industry-specific standard for GHG emissions assessment.

Understanding seafood systems

The characteristics of fisheries, aquaculture and seafood supply chains generally present particular challenges when trying to understand production systems and characterize their GHG emissions. Holistic, LCA type, analyses require data from a range of stakeholders and challenges arise given the profile of the industry: large operators with integrated operations may find data capture relatively straightforward and have the resources to deliver. However, this is less likely amongst smaller operators and where industry activity is fragmented and data deficient.

Collaboration and data disclosure is further undermined by the potentially sensitive nature of the data required and the trust needed to obtain it. Energy (particularly fuel) consumption practices are increasingly important cost drivers; as such they can be seen are sources of competitive advantage (or disadvantage) to be safeguarded rather than disclosed.

The absence of an organising framework describing major seafood supply chains prevents existing LCA studies being placed in context. Without an organising context for existing analyses, industry stakeholders have difficulty identifying previously completed research that might match their circumstances and identify clear gaps in collective knowledge that could result in shared datasets, thus avoiding duplication and saving costs.

Interactive systems and shared datasets

Many seafood operators may find LCA analyses (and similar carbon accounting frameworks including the British Standard Institute PAS 2050 standard on GHG emissions assessment requirements) challenging and costly. LCA analyses, along with standards such as PAS 2050 (2008), depend on very detailed and highly sensitive information. Currently, there is a general lack of data, particularly at the seafood production stages. Where data exists, this often lacks quality assurance and detail affecting robustness and representation. Lack of data on resource use in many systems means detailed data inventories must be compiled for each study. This requirement for detail, the lack of data inventory and general data deficiency make LCA analyses a potentially costly exercise; particularly for smaller operators and limiting its broad applicability across the sector.

Most LCA studies are published in document form fixing the data in space and time and potentially limiting the utility of the research for other stakeholders. Unless an industry stakeholder has a production system that exactly matches the subject system of the study, at the time it was conducted, it may be difficult to use the findings in anything other than a highly indicative manner. This is a challenge for seafood systems, given their inherent dynamism and complexity.

Currently datasets are retained in specific LCA study data inventories or have been translated as simple emissions calculators for the customers of these studies. These isolated datasets prevent the sharing and manipulation of datasets through interactive open systems.

4. Programme of collective action on GHG emissions in seafood

The programme of collective action will establish the following:

1. A common position on GHG emission related methodologies appropriate to fisheries, aquaculture and seafood supply chains
2. A common standard on GHG emissions relating to UK seafood supply chains
3. A framework for understanding, obtaining data and characterising key seafood production systems
4. An interactive platform for sharing seafood supply chain related GHG data

The approach adopted here engages not only technical experts, but also practitioners and NGOs. More specifically, the engagement of particular groups of practitioners (those that are active in particular seafood systems: global - salmon/whitefish/tuna/other pelagic; or local - inshore/artisanal) would help ground the discussions concerning specific seafood systems. Engagement would allow: the implications of certain methodological choices to be explored with relevant stakeholders; allow standards/principles to be debated and agreed; help understanding of, and galvanise improvement action in, seafood systems; and support data sharing.

Objectives

1. Agree a common methodological framework for assessing GHG emissions in seafood
2. Agree common standards in assessing GHG emissions and applied to UK seafood (case study)
3. Establish a better understanding of GHG emissions in key seafood production systems
4. Provide access to shared data

Work programme

The work programme involves three strands of collective action: common methods; data capture in key seafood production systems; and access to shared data. These are discussed in further detail below.

ACTION 1
COMMON METHODS

Lead partner: FAO
Other partners: Seafish, Dalhousie University, British Standards Institute

This action is divided into two parts: (1) development of an agreed methods framework for GHG emissions in seafood and (2) assessment of the potential for GHG emissions

Developing methods for defining systems and data capture
Although there is growing interest in GHG emissions and development of methodologies, these are at different stages of evolution in systems around the world. Accordingly, there is a generic requirement for increased understanding of issues and trends in accounting for GHG emissions. This action will therefore involve an international review of methodologies to establish uptake, purpose, issues and trends.

Having developed an agreed methods framework, appropriate methods will be used to assist in defining seafood production systems and used as the basis for data capture in selected systems.

Assessment of potential for GHG emissions reductions in fisheries and aquaculture
Following the collection of data from specific seafood production systems, a workshop will be held to present the findings and discuss the potential for reducing GHG emissions through changes in technology and practices and the impacts such changes may have on the system. Additionally, given that aquaculture systems may also result in GHG capture, the opportunities for sequestration by aquaculture will also be addressed.

Objectives

1. Engage technical experts to review range of GHG emissions methodologies in use and degree of uptake, identify and illustrate potential implications of method choices
2. Undertake industry-agreed example analyses to illustrate implications and challenges of methodological choices
3. Use methods in case studies of specific seafood production systems

Task 1 Methods review

Desk research
- Review of existing methodologies in use with a focus on those where variation may have greatest potential impact on results
- Review range of existing practice in published seafood supply chain analyses
- Review formal methodological guidance internationally (e.g. ISO 14040 series) and where appropriate emerging national processes *(e.g. from PAS 2050 in the UK, etc)* and related critiques regarding key methodological issues

Technical methods workshop
- Engage technical experts
- Review of stakeholder requirements (e.g. local and global supply chains, aquaculture and capture fisheries, fisheries managers, etc)

- Agreement on appropriate data (both practical and meaningful), methodologies and metrics relative to existing standards (eg Life-cycle methodology (under ISO 14040 series)); guidelines on appropriate contexts for specific methodologies, metrics, boundaries
- Agreed methods and boundaries framework
- Prepare study report on methods for LCA in fisheries and aquaculture

Task 2 Potential for GHG mitigation

Technical mitigation potential (workshop)

- Engage technical experts
- Review seafood production systems GHG emissions (i.e. Findings symposium output)
- Review technologies and approaches for GHG emission
- Assess the impacts associated with adoption of GHG emissions technologies
- Prepare study report on opportunities for GHG reduction and sequestration in fisheries and aquaculture production systems

ACTION 2
COMMON STANDARDS

Lead partner: British Standards Institute
Other partners: Seafish, Industry

In the context of developing common methods internationally, there are specific requirements for understanding methods in localised contexts. For example, in the UK there is a specific need and opportunity to move towards common approaches and voluntary standards.

In this action the establishment of seafood-industry specific supplementary requirements, in line with BSI PAS 2050, will play a central role in further reducing uncertainties. Such a standard would be an internationally recognised, consistent, consensus based, measurement methodology that could help identify specific hotspots for UK industry. The recognition, within the standard, of 'cradle-to-gate' systems boundaries and disclosure will facilitate data sharing and third party analyses and unlock efficiencies in seafood GHG emissions accounting. The development will present a pathway towards a consensus position, and an opportunity for the seafood industry and technical experts to resolve differences in approach to achieve a common position on GHG emissions where this is possible.

The UK experience will be considered as a practical case study and an evaluation carried out to identify merits and demerits associated with utilizing the approach taken in the case study to seafood systems in other countries.

Objectives

1. Through a structured engagement and decision-making process with industry, develop seafood specific standards in the context of PAS 2050 and other standards developments

Task 1 Draft specification

Desk research
- Review formal methodological guidance (see Action 1)
- Review British, CEN and ISO Standards
- Review and engage with relevant British, European national, European and ISO committees

Technical expert's workshop (including international and UK specific dimensions)
- Engage technical experts to source and discuss specific technical content for the standard
- Review of stakeholder requirements (see Action 1)
- Review agreed methods and boundaries framework (see Action 1)

Draft standard specification
- Draft standard specification

Task 2 Consensus building

Review of draft standard at Findings symposium
- Examine seafood production data, and demonstrate emissions results, using alternative methods and boundaries (e.g. if analysis only reported to here, and in

this way, these are the results you would get; if to here and in this way this is what you would get, etc.).
- Summarise and discuss merits of alternative methods and methodological approaches
- Industry, experts, and public stakeholders achieve consensus (potentially by vote) for preferred method/approach

Revised standards
- Revised standard specification
- Public comment and review by steering group

Task 3 Publication

Final standard
- Collation of comments and final review
- Printing and publication of final agreed specification

ACTION 3
DATA CAPTURE AND ANALYSIS OF KEY SEAFOOD PRODUCTION SYSTEMS

Lead partner: Seafish
Other partners: Industry / Dalhousie University / FAO

This action will use a standard framework to organise and describe the main characteristics of key seafood systems (major source locales and production systems (e.g. gear types, farming methods), modes of transport, processing locales, product formats and market outlets). Important seafood systems from global sources (salmon/whitefish/tuna/pelagic/shrimp/other) and local sources (inshore/artisanal, salmon/small pelagic) will be agreed on the basis of production volume and/or market value. Key practitioner groups acting within these systems, such as AIPCE (Whitefish), ISSF (Tuna), GAA (Salmon), will be approached and engaged to allow these systems to be characterised and validated. With major supply chains mapped, a review of existing LCA studies would be overlain to: a) illustrate current understanding of emissions in specific production systems and b) identify data gaps to be closed through additional research. Data from systems would be gathered from developed and developing country sources including, where possible in the available time and resource constraints, countries in the African, Caribbean, and Pacific (ACP) regions.

The outputs of this action would be to characterise key seafood systems and profile associated GHG emissions. This action would also inform key methodological choices for a revised standard, and provide data to be shared by industry. By highlighting key hotspots, this action would also provide pointers towards mitigation options. In capture fisheries, such options might include energy savings structures, gears and techniques; sharing of energy saving practices; and policy measures. In the case of aquaculture opportunities could include feed conversion factors, quantity of fishmeal and fish oil in cultured diets, increasing emphasis on extractive species (such as filter feeders) and other opportunities such as marine algae.

Objectives

1. Engage practitioners to validate seafood systems and prioritise data capture
2. Characterise key seafood systems where data are lacking.
3. Illustrate implications of key methodological choices for Action Item 1 through select supply chain analyses
4. Produce GHG emissions relevant data and industry improvement actions

Task 1 Desk research and research design

<u>Desk research</u>

- Characterise known production systems and networks
- A short period of synthesising, supply chains around major seafood groups (e.g. figure 2.1). How many species to consider, how important e.g. tonnes in fisheries, likely accessibility of data.

Task 2 Characterising seafood systems

<u>Production systems workshop</u>

- A practitioner workshop to review and refine known production systems and networks, map known robust GHG emission analyses over supply chains and identify priorities for further work

- Participants to include multiple retailers, processors and potentially also key production stakeholders (e.g. Alaskan Pollock association) to seek buy in and improve potential data availability.
- Presentation, review and critique of seafood systems (major supply patterns, any studies not represented)
- Identify and prioritise the gaps for data collection, on the basis of limited funds, group decision on where to allocate resources for data capture.
- Agreement on the supply chain systems to be examined, what mapping needs to take place; what data is required from where including important global seafood systems (eg. salmon; whitefish; tuna) and localised seafood systems

Task 3 Data capture, analysis and reporting

Data capture and analysis

- Engage stakeholders in agreed seafood systems
- Characterise priority supply chain data
- Collect GHG relevant data including those data to potentially model alternative methodological options
- Identifying emissions hotspots, identifying significant drivers of emissions, outlining options for how these may be addressed, identify implementation challenges and implications of alternative methods as identified in Action Item 1.

Task 4 Data outputs, and agreed action areas

Findings symposium

- Selected seafood systems characterised (and validated by system stakeholders)
- GHG emissions profiles including hotspots, drivers, options to mitigate
- Impact of methodological choices on outcomes in certain supply chains
- Dataset and report produced on GHG emissions in selected seafood production systems

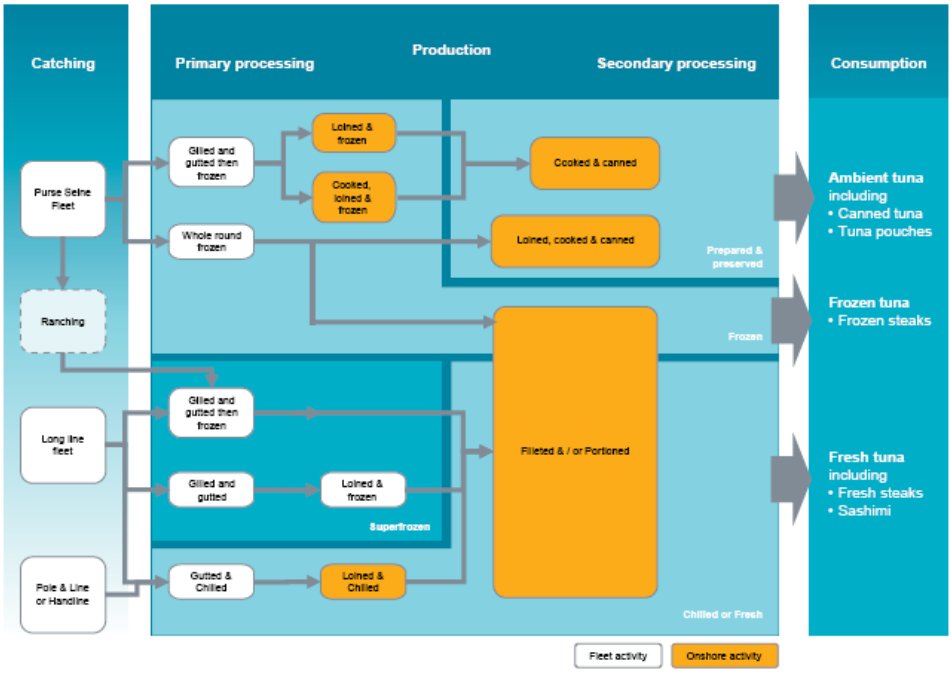


Figure 2.1 Main tuna supply routes from catch to consumption

ACTION 4
ACCESS TO SHARED DATA

Lead partner: Seafish / Third party
Other partners: Dalhousie University / Industry / FAO

This action will establish an interactive platform for sharing critical seafood supply chain related data and/or results of completed GHG emission analyses. It will review and integrate existing but disparate systems to provide a more complete platform. For example, fuel inputs to capture fisheries are major drivers of life cycle GHG emissions. Currently there is no systematic process of securing, storing or sharing data regarding fuel use in fisheries. However, potentially useful data sets exist that can be shared. For example at a UK level, Seafish hold several years data on fuel use per tonne landed by UK fleet segments specified by gear, vessel length, engine size, target species and location, whilst at an international level Dalhousie University maintains a database of fuel use in fisheries data representing in excess of 850 unique country, fishery, gear and year combinations. Such datasets could be used to seed a more widely held and populated database that would be accessible by industry partners. Similarly, as feed inputs are key drivers of GHG emissions from aquaculture, yet are highly variable over time and between specific formulations, it would be extremely useful to establish an accessible dataset of broadly representative feed inputs. One potential source of robust, consistently modelled feed input-related GHG emissions that could be incorporated into a database are those generated by a three year international project, co-led by Peter Tyedmers of Dalhousie University, to characterize the life cycle environmental impacts of major salmon farming systems around the world.

Objectives

- Achieve common data pooling rules, access and sharing rights
- Data standardisation and updating

Task 1 Data sharing principles and mechanism

<u>Data sharing workshop</u>

- Explore and seek agreement on data to be shared and data sharing principles to avoid the threat of free riding (either build on existing platforms, developing something new, black box (stripped of identifiers to ensure anonymity in data provisioning), potentially managed through a third party.
- Explore and seek agreement on mechanism for pooling data (e.g. establishing a third party 'host' organisation)
- Explore and seek agreement on access and sharing rights
- Scoping report on data of interest, data sharing principles and scenarios for pooling data and technical systems

Task 2 Technical options, design and piloting

<u>Technical options</u>

- Review stakeholders' existing data holdings related to key inputs to supply chains (e.g. fuel inputs to fisheries, feed formulations) and/or results and details of completed seafood supply chain GHG emission analyses

- Identify key features of potential data to be shared
- Review of data storage, entry and retrieval needs. Review of online database platform options, their characteristics and costs
- Review data entry options/responsibilities to avoid/reduce data entry errors etc

Design and pilot system

- Interactive system potentially hosted by Seafish, a University or other third party organization and supported by partners
- Establish rules and protocols for data access
- Establish guidance notes on data entry methods and standards
- Establish rules on minimum data contribution requirements to maintain database access

Task 3 Additional data

Procedures for review and incorporation of additional data

- Quality assurance of data 'robustness/representation' in key activities in selected supply chain systems
- Identifying "data rich" and "data deficient" activities; practices in specific fisheries, or in specific production practices (ultra low temperature storage for example) etc (we have lots of data but its old, we have gaps in our data)
- Collation, quality assurance and publishing of datasets
- Options to address deficiencies

ACTION 5
MANAGEMENT AND CO-ORDINATION

Lead partner: Seafish

This action provides the overview and co-ordination of the work programme, collective action lines and partner contributions.

Objectives

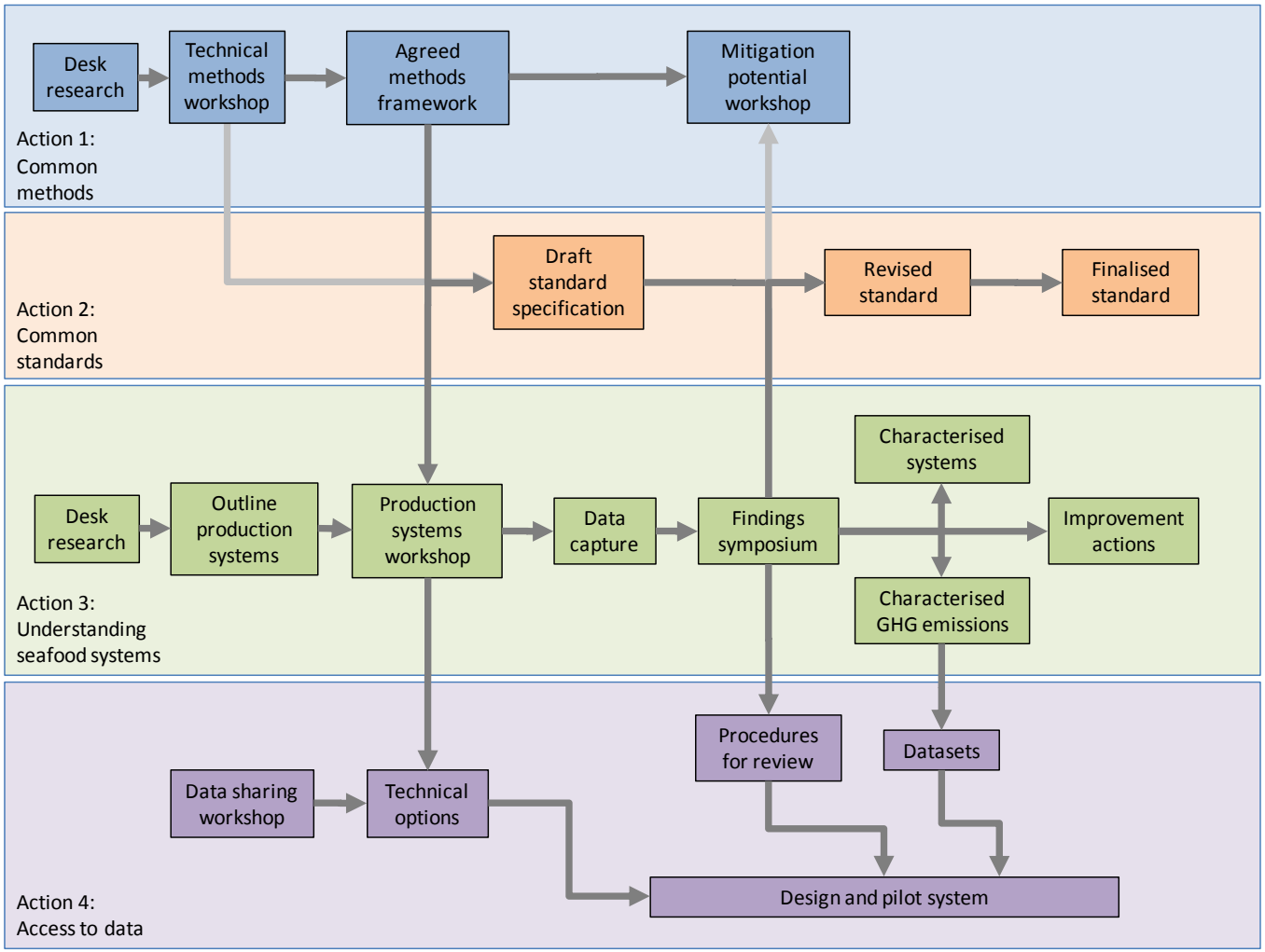
- Regular review and ensure progress against plan and delivery of outputs
- Ensure regular communication amongst partners
- Management reporting to funding partners

Phase 1 Co-ordination and reporting

Co-ordination and meetings
- Kick off meeting
- Project meetings

Reporting
- Interim report
- Final report

Relationships between collective actions – flow diagram



Deliverables

Action area	Deliverables
1. Common methods	• Agreed methods and boundaries framework for trial • Advantages and disadvantages of alternative methods and methodological approaches • Common methodological approach • Opportunities for GHG reduction and sequestration in fisheries and aquaculture production systems
2. Common standards	• Draft standard specification • Final standard specification
3. Data capture on key seafood production systems	• Major seafood systems characterised and validated • Seafood supply chains selected for investigation • GHG emissions, and drivers, identified for selected seafood supply chains • Options to mitigate • Datasets and report on GHG emissions in selected chains
4. Access to shared data	• Agreement on data pooling rules • Mechanism for pooling data • Access and sharing rights agreed • Technical options for interactive platform • Pilot system • Quality assessment of data • Procedures for collation, quality assurance and publishing of data
5. Management and co-ordination	• Interim report • Financial report

Expected benefits and targets

This initiative would provide potential benefits to multiple parties (see Appendix 1). It would provide:

- a valuable resource that would be of ongoing benefit to seafood supply chain stakeholders, particularly those with little or no resource to invest in this issue.

- a resource to those outside of the seafood supply chain (e.g. consumers, NGOs etc) with an interest in understanding the drivers and scale of carbon emissions associated with seafood products.

- A tool for public sector decision-makers (e.g. fisheries managers) to better understand the potential GHG emission implications of management decisions should sufficiently robust data be available.

- Beneficial data to the academic/research community if data regarding fuel consumption etc for underrepresented and out of date supply chains could be elicited by users.

Finally, this initiative would help harmonise approaches to understanding GHG emissions in seafood or at least highlight points of digression between approaches.

As a result of this initiative a number of stakeholders would be expected to benefit against specific benefit categories – see table below (highlighted). Those benefits that can be quantified relate to processing units and to measurable economic benefits and promotion of operational efficiency and improved access to environmental information (highlighted in emphasis).

Benefit categories	**Stakeholders**			
	Supply chain stakeholders	Consumers / NGOs	Public sector decision-makers	Academic / research community
Measurable economic benefits / promote operational efficiency				
Increase competitiveness / quality /value from existing markets / products				
Promote sustainability, quality of environments & quality of stocks / species				
Reduce adverse impact on environment, habitats & on resources				
Support awareness and understanding of environmental issues & impacts				
Improve access to environmental information				

Options analysis

An options analysis is summarised below. This considers the costs and benefits to the UK exchequer using the results of an analysis conducted in Appendix 1 (costs and benefits relevant to processors in England). Three options are considered, namely:

- scenario 1 in which no activities are undertaken;
- scenario 2 in which only some actions are undertaken (either methods only, seafood systems only, or seafood systems and data sharing only); and
- scenario 3 in which all actions are undertaken.

On the basis of the net benefits profile, the most beneficial option is scenario 2 (2.3 systems and data sharing only). However, this net benefit estimate does not account for the costs of *lost synergies and comparisons* with subsequent LCA analyses the industry may undertake based on agreed common methods. Effectively the benefits in scenario 2 (2.3) would be restricted to the LCA analyses done within the project i.e. downstream benefits arising from subsequent LCA studies would be lost[1]. The option is therefore rejected in favour of scenario 3 (Do all elements of the project).

[1] Although very difficult to estimate, the consideration of downstream benefits from *synergies and comparisons* within scenario 2 (2.3) would serve to reduce the associated net benefit for scenario 2 (2.3) whilst serving to increase the net benefit figure for scenario 3.

Options	Estimated costs	Estimated benefits	Net benefit
Scenario 1 Do nothing	• Duplication of effort – Large co's conducting same studies (£1.5m) • Financial burden on smaller companies (£2.2m) • Synergies and comparisons lost	• Saving on project spend £386k	• (£3.3m)
Scenario 2 Do partial			
2.1 Methods only	• Project spend (£166k) • Duplication of effort – Co's conducting same studies (£1.5m) • Financial burden on smaller companies (£2.2m)	• Synergies and comparisons	• (£3.5m)
2.2 Systems only	• Cost of project (£173k) • Synergies and comparisons lost	• Shared effort £1.5m	• £1.3m
2.3 Systems and data sharing only	• Cost of project (£190k) • Synergies and comparisons lost	• Shared effort £1.5m • Reduced financial burden for small companies £2.2m	• £3.5m
Scenario 3 Do all	• Cost of project (£386k)	• Shared effort £1.5m • Reduced financial burden for small companies £2.2m • Synergies and comparisons	• £3.3m

Justification and support for the initiative

At a global level the issue has been recognised and discussed at length at the international symposium on Energy in Fisheries, held in Seattle November 2010 and by the United Nations Food and Agriculture Organisation (FAO). In February 2011, at the twenty-ninth session of the Committee on Fisheries, the Committee recommended that FAO should provide Members with information on possible fishing industry contributions to climate change and on technologies and ways to reduce the sector's reliance on, and consumption of, fossil fuels, respecting the principles embodied within the United Nations Framework Convention on Climate Change (UNFCCC). The issue has also been recognised in the context of UK Government policy on sustainable consumption and production and food security (as illustrated in DEFRA research such as the *Review of industry, Government and other action to improve the sustainability of fish and shellfish production and consumption* and the Foresight report *The Future of Food and Farming*. At the UK industry level, the GHG emissions agenda is high on the priority list of the multiple retailers and the issues addressed in this proposal have been recognised in seafood by the Common Language Group (a pan industry group of 30-40 industry, government, and Non-governmental organisations), and a specific industry issues group examining GHG emissions in seafood.

Key partners

Seafish
Major UK processors (including Birds Eye Iglo, Findus, Cumbrian Seafoods, Espersen, Le Lien)
FAO
British Standards Institute
Dalhousie University
Global Aquaculture Alliance

Budget – outline costs and funding

	ACTIVITY			COST (£)	FUNDING SOURCES (red = cash, black=in-kind)			
		DAYS	DAY RATE (£)		FAO	DU	Industry	EURO Fund
ACTION 1 Common methods	1.1 Methods review							
	Desk research							
	Technical methods workshop							
	Methods framework							
	1.2 Potential for GHG emissions mitigation							
	Technical mitigation workshop							
	Subtotal*			**£110,667**	**£84,848**	**£2,800**	**£0**	**£23,019**
ACTION 2 Common standards	2.1 Draft specification							
	Desk research							
	Technical methods workshop							
	Drafts standards specification							
	2.2 Consensus building							
	Review of draft at Findings symposium							
	Revised standard specification							
	Collation of comments							
	2.3 Publication							
	Final specification: seafood supplementary requirements PAS2050							
	Subtotal*			**£60,000**				**£60,000**
ACTION 3 Data capture on key seafood systems	3.1 Desk research and research design							
	Desk research	20	500	£10,000				
	3.2 Characterising seafood systems**							
	Production system workshop	20	500	£10,000				
	Main fisheries, Production/capture, Processing, Transportation, Product formats, Consumption and markets							
	3.3 Data capture, analysis and review***							
	Data capture and analysis	200	500	£100,000				
	3.4 Data outputs and agreed action areas							
	Findings symposium	25	500	£12,500				
	Reporting	10	500	£5,000				
	Mitigation actions							
	Subtotal	**275**	**500**	**£137,500**	**£36,364**	**£7,000**	**£25,400**	**£68,736**
ACTION 4 Access to data	3.1 Data sharing principles and mechanism							
	Data sharing workshop	5	500	£2,500				
	3.2 Technical options, design and piloting							
	Technical options	5	500	£2,500				
	Design and pilot system	10	500	£5,000				
	3.3 Additional data							
	Procedures for review	10	500	£5,000				
	Incorporation of additional data	5	500	£2,500				
	Subtotal	**35**	**500**	**£17,500**	**£0**	**£4,200**	**£0**	**£13,300**
ACTION 5 Management	4.1 Co-ordination and reporting							
	Co-ordination	45	500	£46,742				
	Kick off and project meetings (web)	18	500	£9,000				
	Subtotal			**£55,742**	**£24,242**	**£0**	**£5,850**	**£25,650**
	TOTAL	**310**		**£381,409**	**£145,455**	**£14,000**	**£31,250**	**£190,705**

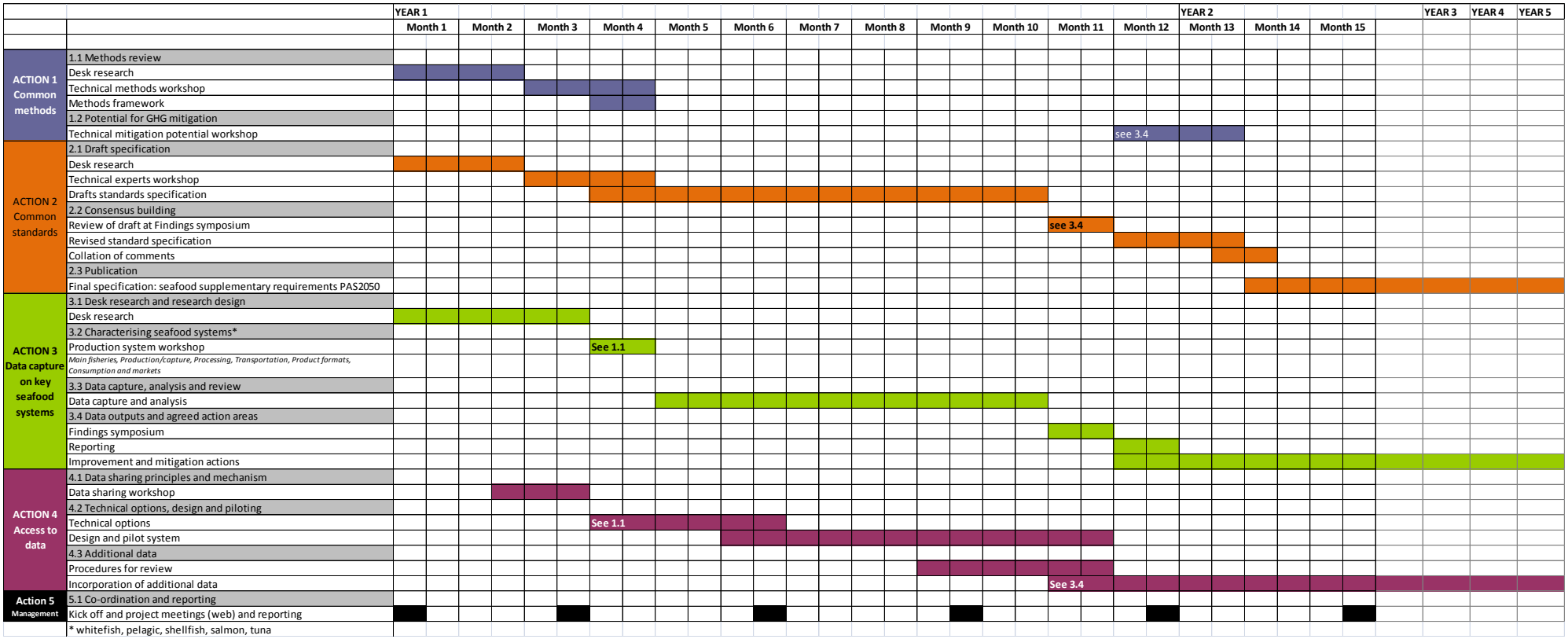
Notes:
*Typical costs of standards development (source: British Standards), **Whitefish, pelagic, shellfish, salmon, tuna ***Assuming 5 supply chains

In-kind contributions

In-kind contributions that have been secured to date include 20 days of effort on the part of Dr. Peter Tyedmers of Dalhousie University (valued at £14,000) for expert input to workshops, task supervision, etc. In addition, Dr. Tyedmers will provide access to an existing database of fishery fuel consumption information for free should appropriate data access and sharing agreements be reached. In addition, 50 days of effort are contributed on the part of FAO (valued at £24,242) for input to workshops, liaison and co-ordination. Finally, in-kind contributions of 25 days are secured from four of the key UK industry partners (total value of £16,250) for co-ordination, expert input and workshop participation.

Timescales

Start date: 01/08/11
End date: 31/12/12



Appendix 1 – Costs and benefits of collective action

Important factors that can have a bearing on GHG emissions in seafood

Estimates of GHG emissions can be heavily influenced by a number of specific factors in seafood systems (not just fuel price/consumption), these include:

- Condition of fish stocks
- Fuel use in capture fisheries
- Refrigerants
- Raw material yields
- Mode of transportation (e.g. container ship versus air freight)
- Feed composition/sourcing, and mitigation effects in aquaculture

Where and how GHG emissions estimates may be used

Estimating GHG emissions may be used as a:

- A *regulatory issue* as a factor in marine spatial planning and fisheries management. Industry sectors are already submitting evidence to UK Government accounting for contribution to GDP, employment and GHG emissions from use of the marine resource.
- A *market issue* to address misperceptions or as a support to consumer choices e.g. labelling/product declarations. The seafood industry has already had to defend practices as part of a food miles campaign in 2006/7.
- A *system performance issue* as a means of improving efficiency and effectiveness of particular supply chain practices. GHG emissions have already been highlighted for attention in 2010 by research into Sustainable Consumption and Production in seafood for the UK Government.

Cost areas in estimating GHG emissions

Costs associated with estimating GHG emissions include:

- Accessing LCA expertise
- Collecting data
- Acting individually and duplicating effort in replicating LCA studies (using common methods, adopting common standards)

Benefits associated with collective action on estimating GHG emissions

Benefits associated with collective action include:

- A valuable resource of ongoing benefit to supply chain stakeholders within the seafood system. An example of this might be that small, niche, operators can respond to customer requirements using data collectively generated; this has been evidenced by past experience of a small processor able to respond to a specific customer request and directly supported by initial GHG emissions work done by Seafish/Dalhousie University.
- A resource to stakeholders outside the seafood supply chain but within the seafood system, specifically for:
    - consumers and NGOs
    - public sector decision-makers

  An example of this might be supporting NGO/public policy enquiries on GHG emissions implications of seafood practices; this has been evidenced by past experience from an NGO initiative utilising initial GHG emissions work done by Seafish/Dalhousie University (see *Moving Towards Low Impact Fisheries in*

Europe: Policy Hurdles and Actions, MacAllister Elliot and Partners Ltd for Seas at Risk, 2009)

- Providing beneficial data to the academic community where data for under-represented supply chains can be elicited.

Quantifying and analysing costs and benefits

The cost-benefit analysis considers the direct costs associated with assessing GHG emissions as individual operators, and the direct benefits that can be attributed to supply chain stakeholders though this collective action.

There are a range of benefits and a range of potential beneficiaries. Given the challenge in quantifying these benefits, the analysis is based on the *direct costs and benefits* expected for the primary beneficiaries.

Given the presence of the multiple retail, niche retail and food service (institutional) sectors, and the concentration of processing activity, the primary beneficiaries are considered to be seafood processing units in England. It does not reflect the likely wider indirect benefits expected for other parts of the seafood industry in England (such as the catching sector), other processing units and parts of the seafood industry in the UK and elsewhere. This restricted analysis therefore *falls short of capturing the full benefits attributable to this initiative*.

In 2010 there were 240 processing units in England (442 of these in the UK). Of these 240, there were 20 large units, 41 medium units and 179 small units in England (48%, 43 and 49% of UK total respectively).

Customer types likely to regard GHG emissions as an important factor in seafood supply are considered to be multiple retail, niche retail, and food service (institutional) sectors. In 2008 it is estimated that 71% of large units, 14% of medium units and 15% of small units served these customers. That is, potentially 47 processing units might be expected to account for GHG emissions.

It is estimated that an LCA analysis of each supply chain would cost approximately £10,000 and a £10,000 overhead. It is expected that large and medium units would likely use 10 supply chain data and small units would use 5 supply chain data.

On the basis that large units would duplicate effort and medium and small units would have to finance their own LCA analyses, if the identified units were all to conduct separate LCA supply chain studies, then this would represent a total cost of £3.82m in England (£7.52m at a UK level).